Site 182 Lower Days Pond

Overview: The Lower Days Pond potential restoration site is located to the south of Route 127 (Eastern Avenue) approximately 0.25 mi east of the Route 128 intersection. The site encompasses approximately 2.8 ac of emergent marsh upstream of an existing culvert crossing under an earthen berm. The berm is approximately 21 ft wide at the base, 7 ft wide at the top, and 6 ft in height. The narrow dimensions along with existing mature trees growing along the top of the berm make construction access difficult. The berm was reportedly constructed to create an impoundment for ice collection during winter months. Currently there are only a few very small areas of standing water. Upper Days Pond bordering the northern edge of the Route 127 shares a similar origin. The restoration area is shown as a pond on 1893 USGS mapping (Gloucester, MA Quadrangle USGS 15 Minute Series). The site drains through a 12 in CIP culvert at the base of the berm which connects to a tidal creek that drains to the ocean at Good Harbor Beach. The linear channel extending from the culvert outlet to the tidal creek is approximately 3 ft deep and 5 ft wide. There were no channels observed in the restoration area near the outlet. The site receives substantial urban stormwater from the adjacent developed lands. The existing base elevation of the site is approximately 0.6 ft higher than the typical high marsh plain below the berm. There are at least two large municipal stormwater discharges into the wetland. Approximately one-third of the marsh is dominated by a vigorous stand of *Phragmites*. The stand is primarily found along the rear lots of homes abutting Abbot Road and along the berm. The close proximately of the tall *Phragmites* stand to these residences can present a fire hazard. The remaining portion of the emergent wetland is dominated by *Typha*.

Tide gauge data collected in late April of 2005 documented a maximum restriction of approximately 0.5 ft. However, little or no restriction was recorded during typical spring tide conditions. The lack of any defined channels within the potential restoration site, combined with the relatively high ground elevations in comparison to the downstream salt marsh, results in limited exchange of tidal water. The entire restoration area including the berm and the small ditch connecting the tidal creek to the culvert within the berm is contained on a single parcel in private ownership.

Structure conditions: An earthen berm separates Lower Day's Pond from the adjacent salt marsh downstream. Tidal flow from a small creek is conveyed into the site via a 12 in cast iron culvert. Stone placed upstream of the culvert prevents the marsh from draining down to the elevation of the invert. The berm is well-vegetated. There is some minor erosion around the culvert, but overall the berm and culvert are in good condition

Ecological Integrity: The site has been highly modified by human activities for an extended period of time. It is unclear what may have existed on the site prior to the creation of the pond for collecting ice or if this activity was limited to the creation of the berm. In subsequent decades, the surrounding watershed was densely developed filling edges of the wetland and directing stormwater into to the basin. It appears sediment from the contributing watershed along with the accumulation of organic material has raised the ground elevation within the former pond and eliminated the open water shown on early USGS mapping. Soil samples from the southern end of the site show a densely rooted organic horizon approximately 1.5 ft in depth over dense marine origin clay. Soils just downstream of the berm consist of typical salt marsh peat with depths in excess of 5 ft. Approximately one-third of the restoration area is dominated by a vigorous stand of *Phragmites* with the remaining emergent area dominated by *Typha*. It is unlikely that the cattail stand will be a sustainable community. The northern limit of the wetland which receives the overflow from Upper Days Pond is a small forested wetland dominated by red maple and black willow. Relatively large stands of *Phragmites* are also found in close proximity

downstream of the berm fringing upland locations. The more vigorous stands appear to be associated with stormwater outfalls from adjacent development. The fringes of the salt marsh are densely developed including a large commercial complex directly across the tidal creek.

The entire restoration area including the berm and the small ditch connecting the tidal creek to the culvert is contained on a single parcel in private ownership. There are several municipally-owned parcels nearby including the lands associated with Upper Days Pond north of Route 127, a portion of the salt marsh just upstream of the ditch leading to the berm, and the lands associated with Good Harbor Beach. The site is not contained within an ACEC, BioMap designations or listed species habitat. The tidal creek downstream of the site is mapped as suitable habitat for soft shell clam and the Good Harbor Beach front is mapped as suitable habitat for surf clam.

The elevated invert above the creek bed restricts upstream fish passage during the lower portion of the flood tide. However, there is very limited fish habitat upstream of the berm due to the relatively high ground elevations and lack of sustained base flow discharge.

Tide gauges placed on either side of the berm and deployed between April 20 and May 2, 2005 documented a major reduction in tidal amplitude as well as a restriction in height during large spring tide events. The total tidal prism of the marsh creek downstream of the culvert is more than 4 ft. The tidal prism in Lower Day's Pond varies from 0 to approximately 0.9 ft. Stones placed near the upstream invert create a small impounded area. This factor along with the small pipe and substantial rainfall/stormwater contributions on both the 24th and 28th, caused the site to maintain a standing water depth of approximately 6 in during the period of the gauge deployment. There were a total of 23 tidal cycles recorded downstream of the culvert during the deployment period. The gauge upstream of the culvert recorded a tidal prism on only 8 of the 23 tidal cycles, when the tide height downstream was 5.68 ft NAVD or higher. The highest tide downstream of the culvert was recorded on April 28 at 3:06 AM. The NAVD adjusted height was 7.01 ft. The upstream adjusted height was 6.52 ft. and occurred at 4:02 AM.

The restriction caused a tidal dampening of 0.49 ft upstream of the culvert and a delay of 56 minutes. The dampening amounted to approximately 11.1% of the total tidal prism recorded at the downstream gauge. Measured salinities recorded during slack ebb tide were 0.4 ppt upstream and 0.2 ppt downstream of the culvert. These values are indicative of significant freshwater contributions to the marsh system, especially during spring tide conditions. Tidal flow into Lower Day's Pond occurs during approximately 1/3 of tidal cycles in the adjacent marsh system. When tidal heights are high enough to cause flow into the pond, there is both a dampening and delay of tidal flow into the restoration area. If the ground elevations upstream of the berm were more comparable to the downstream marsh, a greater restriction in tide heights would be anticipated.

The overall severity of the existing impairments is considered severe. A reduction in the tidal restriction with the replacement of the existing culvert with a larger structure would have limited benefits in controlling the advance of the *Phragmites* stands due to the existing ground elevations. The restoration of salt marsh (assuming that was the original vegetation cover prior to the construction of the berm) would also require lowering the existing elevations by a minimum of 0.6 ft and constructing a creek system to allow for the effective circulation of tidal flow and drainage of freshwater contributions to the system. Additional excavation would be necessary to remove *Phragmites* rhizomes. The work would also result in the conversion of *Typha*-dominated marsh. No impact to the fringing forested wetland would be anticipated. The presence of several low lying properties along Abbott Road is also factor into the restoration feasibility. The lowest lying house along Abbott Road has a basement elevation of approximately 8.5 ft NAVD and yard elevation of approximately 6.4 ft.

Berger also investigated a small area of historic fill on the salt marsh approximately 400 ft southwest of Lower Days Pond. The area largely consists of a narrow linear area of fill extending from the edge of the upland to the edge of the creek. The fill is comprised entirely of large stone varying in diameter from approximately 1 to 3 ft. The area of stone fill is approximately 75 ft in length and 18 ft in width. The depth of the stone fill is approximately 4 ft near the upland edge and tapering to the existing marsh elevation. The site reportedly was the location of a small fishing wharf along a small embayment within the creek. There was no additional evidence of past structures (e.g., wooden piles) remaining in the area. The area has good construction access from the adjacent side street. The work would not impact any abutting properties or known utilities. The work could be accomplished without the need of dewatering. The site is privately held and would require the permission of the current land owner. A cost estimate of the removal of this stone fill would be in the range of $10,000. This smaller scale project could be undertaken by the City or other private developer in need of mitigation credits.

Socioeconomic: Recreational values of the potential restoration site are limited by the poor access, parking and private ownership. Educational opportunities are enhanced by the present of several nearby schools. The site's Uniqueness/Heritage value is somewhat enhanced by its undeveloped viewscape and wildlife values within an urban setting setting. The area is not contained within an ACEC, or other important habitat designation, nor does it include any known cultural resource elements or urban setting values.

Construction Logistics/Feasibility: The overall constructability for this potential restoration site is medium. There are no utilities or traffic impacts that would adversely influence construction costs. However, construction access for work on the berm is limited. The berm near Abbott Road is narrow and would require tree removal and widening to support construction equipment. There is an undeveloped lot off of Marina Drive that is better suited for use as a staging area and access point to the site. Work within the marsh could also be accessed from the rear of the commercial land uses which abut the site to the north. This area is not ideal for work on the berm due the distance.

To improve tidal flow at the potential restoration site, the existing 12 in culvert will have to be replaced with a larger (approximately 60 in) pipe or box culvert. Due to the presence of low-lying abutters it is assumed that breaching or removing the existing berm is not a feasible option. In addition to installing a larger culvert, restoration work will have to be performed in the site to remove *Phragmites* stands and accumulated sediment (approximately 7,000 cubic yds), stabilize existing stormwater outfall locations, and create a series of drainage channels. The total construction cost associated with is project is estimated to be $450,000. This estimate does not include end-of-pipe structural BMPs.

Restoration Potential: The site is considered to have low restoration potential based primarily on the lack of important socioeconomic factors associated with the site and the complexity of the required restoration. Existing elevations above the berm are currently too high to support healthy high marsh vegetation. The berm currently provides some level of flood control to abutting low-lying properties. The number of abutting properties along Abbott Road will also increase the amount of outreach required to gain support for the project. The complexity of the project is also increased by the substantial stormwater contributions to the site. The amount of planning and construction work required would result in relatively high project costs. In its current state, the wetland likely provides effective water quality attenuation due the dense persistent vegetation and diffuse surface flows.

Without restoration measures, the amount of dense *Phragmites* in close proximity to existing homes will continue to expand and increase safety risks. An effective restoration effort within this highly developed watershed would also benefit from watershed-wide planning efforts. Future steps leading toward project implementation should focus on gauging the level of interest among the current land owner and municipal officials in a comprehensive watershed approach to solving existing impairments within Lower Days Pond. At one point in the past, there was a group of volunteers working toward raising awareness of water quality issues in Upper Days Pond. A better understanding of historical conditions, potential contamination associated with past filling, water quality, and current stormwater management would also be helpful to determine the feasibility of the restoration project. It may be possible to secure non-point source funding to address stormwater quality.

Site # 182 | Site Features | Scale: 1:1,800

Photo 1 - Salt Marsh Downstream of Berm

Photo 2 - Properties along Abbott Road Abutting Site

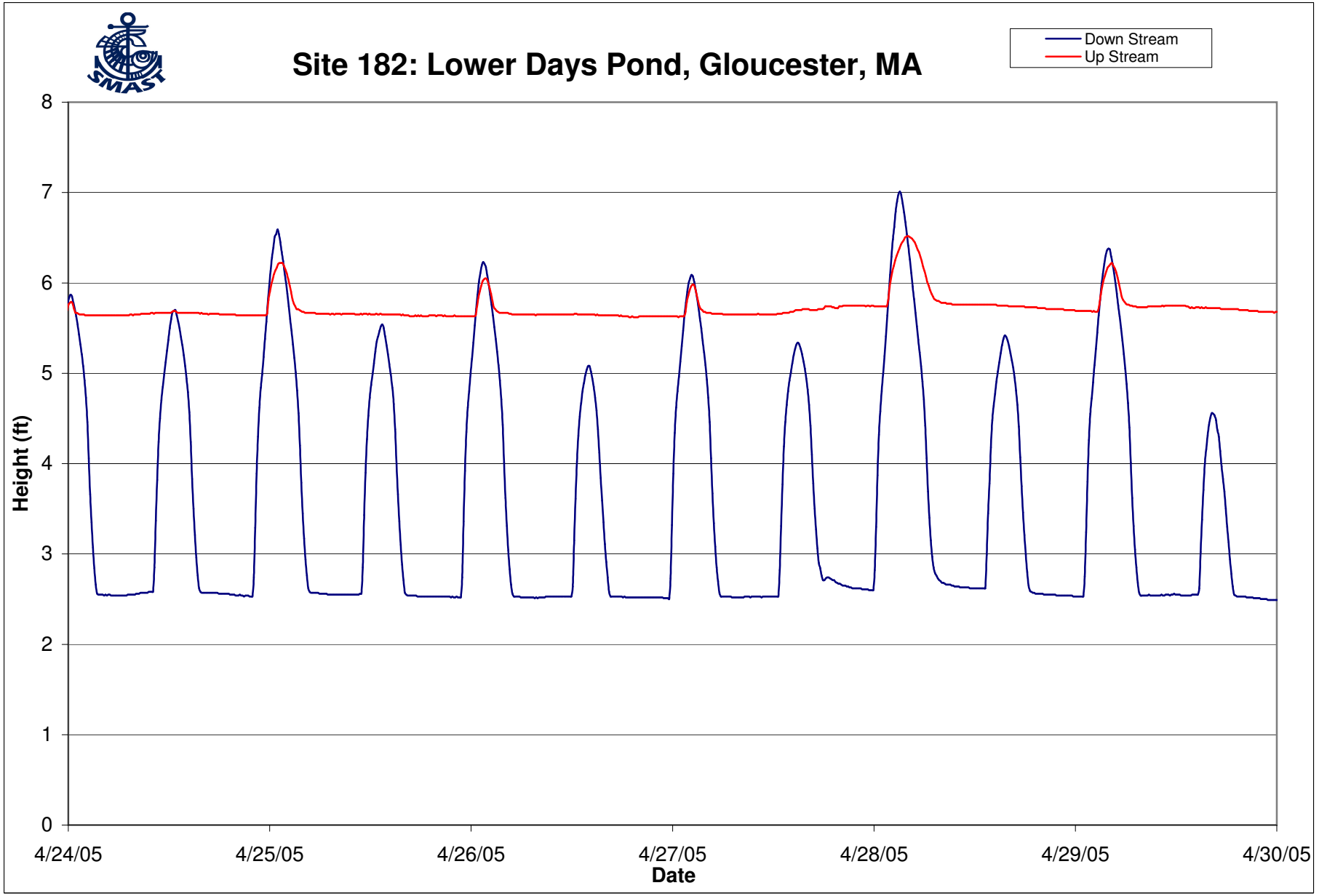
Photo 3 - Upstream View of Site from Berm

Photo 4 - Downstream View of Berm

Photo 5 - Sediment from Abbott Road

Photo 6 - Area of Stone Fill Viewing North

Photo 7 - Area of Stone Fill Viewing South


Site 182: Lower Days Pond, Gloucester, MA
Down Stream
Up Stream
Height (ft)
8
7
6
5
4
3
2
1
0
4/24/05
4/25/05
4/26/05
4/27/05
4/28/05
4/29/05
4/30/05
Date

Great Marsh Coastal Wetlands Restoration Planning
Rapid Field Assessment

Site # 181
Good Harbor Beach

Site Information

Site ID:	181
Site Name:	Good Harbor Beach
Municipality	Gloucester
Location:	Municipal Beach, south of Route 127 (Thatcher Road)
Adjacent Waterbody:	Good Harbor Creek

Affected Area (Acres)

Mudflat/Open Water:	0	Total Area:	2
Salt Marsh:	0		
Other Wetland:	0	*Other Description:*	
Other:	2	Fill	

Impairment(s)

Tidal Restriction	☐	Fill	☑
Obstructed Ditche(s)	☐	Invasive Species	☑
Impoundment	☐	Pollution / Siltation	☑

Severity of Impairments: Severe

Project Type

Roadway Culvert(s)	☐	Obstructed Ditches	☐
Bridge	☐	Fill	☑
Berm	☐	Other	

Evidence of Restriction

Gauge Data	☐	Impounded Flow	☐
Downstream Scour Pool	☐	Obstructed Flow	☐
Upstream Scour Pool	☐	Invasive Species	☐
Bank Erosion	☐	Ponded Conditions	☐
Slumping	☐	Subsidence	☐

Structure / Channel:

Overall Condition:	
Life Expectancy (Years):	
Road Condition:	
Structure Type:	
Structure Age (Years)	
Structure 1 Width (Feet):	
Structure 1 Length (Feet):	
Structure 2 Width (Feet):	
Structure 2 Length (Feet):	
Skew (Degrees):	
Cover (Feet):	
Scour Protectection:	☐
Adequately Aligned:	☐
Headwall Type:	
Headwalll Condition:	

Ecological Integrity / Habitat Value

Surrounding Land Use %

Commercial / Industrial	20
Residential	40
Agricultural	0
Undeveloped	40

Severity of Impairment(s)	Severe
Invasive Plant Cover:	Low
Extent of Wooded Buffer:	Poor
Habitat Connectivity:	Fair
NHESP Estimated Habitats of Rare Wildlife:	☐
NHESP Priority Habitats of Rare Species:	☐
NHESP BioMap Core Habitat:	☐
NHESP BioMap Supporting Natural Landscape:	☐
ACEC:	☐
Anadromous Fish:	☐
Shellfishing Suitability:	☑
Barriers to Fish Passage	Severe

Great Marsh Coastal Wetlands Restoration Planning
Rapid Field Assessment

Site # 181
Good Harbor Beach

Construction Logistics / Feasibility

Traffic Volume	Low
Detour Potential	☑
Site Access	Good
Staging Areas	☑
Fill Material Concern	Moderate
Low Lying Property Concerns	None
Overhead Utility Constraint	None

Underground Utilities

Water	☐	*Telephone*	☐
Gas	☐	*Sewer*	☐
Electric	☐	*Drainage*	☐

Permitting Complexity	Medium
Local Support	Yes
Feasibility Cost	25,000
Design Cost	60,000
Permitting Cost	25,000
Construction Cost	240,000
Total Cost	350,000
Relative Cost/Acre	175,000

Socioeconomic

Recreation

Public Access:	☑
Watercraft / Portage:	☐
Wildlife Viewing:	☑

Education

Schools Nearby:	☑
Ongoing Research:	☐
Education / Outreach Potential:	High
Saftey Concerns (Access):	Low

Uniqueness / Heritage Value

Rare Species Habitat:	☐
ACEC:	☐
Cultural Resource Features	☐
Urban Viewscape Value:	High
Urban Habitat Value:	High

Tide Surveys

	Start:		*Finish:*
Dates of 1st Survey:		-	
Date of Highest Tide:			
Max Measured Tidal Dampening:			
Percent of Tidal Prism:			
Measured Delay:			

	Start:		*Finish:*
Dates of 2nd Survey:		-	
Date of Highest Tide:			
Max Measured Tidal Dampening:			
Percent of Tidal Prism:			
Measured Delay:			

Summary

Uniqueness / Heritage Value:	Medium	Ecological Integrity:	Low
Recreational Value:	High	Logistics / Feasibility:	High
Educational Value:	High		

Restoration Potential: High